

Appl. No. 10/092,577
Amdt. dated May 17, 2004
Reply to Office action of February 17, 2004

REMARKS/ARGUMENTS

Claim Amendments

Claims 5-10, 12, and 13 are now pending. Claim 5 has been amended to refer to a first gas and a second gas as described in parts (e) and (f) of the claim respectively. The reference to the bubbles causing a gas to be liberated from the water in the tank has been deleted. A wherein clause has been added to describe the first gas as a mixture of the second gas and air. The Applicants submit that these amendments are consistent with the previous version of claim 5 but more clearly describe the composition of the gases in steps (e) and (f) as described in the specification. Claims 6, 7 and 12 have been amended accordingly. New claim 13 adds a further step of drawing a flow of air from the atmosphere into a flow of the second gas to create the first gas. These steps are supported by page 7, line 5 to page 8, line 11 of the specification, particularly page 7, lines 14-16 and page 8, lines 1-4. Claim 9 has been amended to add a minimum superficial velocity of aeration, supported by page 6, lines 9-22 of the application, and that the concentration of carbon dioxide is sufficient to maintain a pH in the water in the tank of less than 8, as supported by the specification at page 2, lines 9-24. The Applicants submit that no new matter is added by these amendments.

Amendment to the Figure

Figure 1 has been amended to correct a drafting error that may have made the feed water inlet 16 appear to be improperly connected to the air exhaust port 61.

Claim Rejections – 35 USC 102/103

The Office Action rejected claim 5 as being anticipated or made obvious by Cote et al (US 5,607,593). The Office Action states that Cote discloses introducing air bubbles in the water to inhibit membrane fouling. However, with one exception, the references in the Office Action all refer to ozone, not air. The Office Action

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states on page 5 that ozone is mostly air based on a web site related to a home air purifier. This web site is not a citable reference and there is nothing to indicate that the discussion on the Web site is related to the ozone supply means 22 of Cote '593. In contrast, a house air purifier is unlikely to be suitable for use in a water treatment plant. Ozone may also be produced from oxygen and it is also possible that ozone supply means 22 is merely a container of ozone produced elsewhere. Accordingly, the Office Action does not provide prima facie evidence as to the nature of ozone supply means. Further, since Cote '593 consistently refers to the ozone as simply ozone, a person skilled in the art would assume that the concentration of the ozone was at least significant and not equate the ozone in Cote '593 with air. The one cited reference in Cote '593 that does refer to air, Column 5, lines 53-55, refers to air from the air compressor of column 5, line 47. This air compressor does not replace the ozone-injection circuit and is not connected in any way to any means for recovering residual ozone. As a result, the flow of gas creating bubbles in Cote '593 does not consist essentially of air and gases contained in the bubbles after they have risen past the membranes. In contrast, Cote '593 discloses creating bubbles with a gas at least having an elevated ozone content.

The Office Action further states that it is inherent in Cote that carbon dioxide would be inherently recycled in the "recycle stream" of Cote '593. But there is no apparatus forming a "recycle stream" disclosed in Cote '593. The Office Action defines the prior art device (Cote '593) as a device that bubbles air in water. But such a device does not support the application of In re King because a device that, among other things, collects gases, mixes gases and makes bubbles would be required to argue that a prior art device inherently performs the method of claim 5. Cote '593 describes no such device. In the embodiments with bubbles to inhibit fouling, gases collected from the surface of the tank water are destroyed (column 9, lines 3-5). The only reference to recycling collected gases is two lines (column 4, lines 46-47) that do not disclose any system at all. Instead, these lines

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just say that ozone (not any other gas) could be reinjected into the installation. There is no disclosure as to how this might be done or what system might accomplish it. Cote '593 is also not an enabling disclosure of any "recycle stream".

The Applicants further submit that claim 5 is not obvious in view of Cote '593. The gas injected into the tank to create bubbles in Cote '593 is intended to have significant ozone content. But the bubbles are also expected to transfer their ozone to the tank water. If the ozone supply were of a type that converts air to ozone, the oxygen content in these bubbles would also be lower, because the oxygen would have been converted to ozone, and the ozone, for the most part, dissolved into the tank water. Accordingly, gases collected from the bubbles after they rise past the membranes would be low in both oxygen and ozone and unsuitable for recycling into any system intended to produce new bubbles with elevated ozone content. Further, Cote '593 only collects gases so that residual ozone is not released to the atmosphere which does not suggest any modification intended to make use of any other gas contained in the bubbles after they rise past the membranes.

Claim Rejections – 35 USC 103

Claims 6-10 and 12 were rejected as being obvious in view of Cote '593 and Dickerson et al (US 6,221,254 B1). As discussed above, the Applicants submit that Cote '593 does not teach or make obvious all of the limitations of claim 5 as stated in the Office Action. Accordingly, claims 6-10 and 12 are also not made obvious by Cote '593 in view of Dickerson '254. Further, the Office Action does not provide a prima facie case to why a person skilled in the art would find it obvious to combine Cote '593 and Dickerson '254 in a way that results in the claimed invention. The improved pH control and other advantages cited in the Office Action could be achieved by other means that would not result in the claimed invention. In contrast, Cote '593 clearly teaches adding ozone to any

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flow of gas creating bubbles which rise past the membranes. Once the bubbles reach the surface they will have been substantially depleted of ozone and oxygen, if oxygen were originally present, but may or may not have picked up material amounts of carbon dioxide. Accordingly, the gases released after the bubbles have past by the membranes are not ideal for recycling to the system that produces bubbles for the membranes. Referring to claims 6, 7 and 9, it would not be obvious that a modified system as in Cote '593 could be created that would have all the limitations of these claims and still provide sufficient amounts of ozone to be consistent with the teachings in Cote '593. It is also not obvious how or whether Cote '593 could be modified such that the gas sent to the water in the tank would have a sufficiently elevated concentration of carbon dioxide to make the teaching of Dickerson of interest. The numerous structural differences between Cote '593 and Dickerson also make their combination unlikely.

Referring to claim 12, Cote '593 teaches that ozone has to be collected because it is toxic and should not be released to the atmosphere. This clearly teaches against claim 12 and so claim 12 is not obvious.

Regarding new claim 13, the claim provides further limitations that are not anticipated or made obvious by any of the cited references.

For the reasons above, the Applicants submit that the claims are allowable.

Respectfully submitted,

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Attachments